

CHAPTER 5 WEST WHIDBEY ISLAND SHORELINE

Chapter 5 includes a description of the marine shoreline reaches located along the western shoreline of Whidbey Island, within Water Resource Inventory Area (WRIA) 6. This chapter covers nine marine reaches numbered from north to south along the West Whidbey shoreline, as well as a reach for Smith and Minor Islands located approximately 4.8 miles from Whidbey Island within the Strait of Juan de Fuca (Figures 5-1 and 5-2 and Table 5-1).

Shoreline erosion and deposition processes on the West Whidbey shoreline are relatively intact compared to other areas of Puget Sound, despite the fact that much of the shoreline is developed with residential and park uses. The topography undulates alongshore with many low lying shores that rise gradually to steep bluffs on the order of 225 feet in height. Shore types include bluff-backed beaches, barrier beaches and embayments that typically encompass tidal wetlands and coastal lagoons.

The marine shores of West Whidbey are the most wave-exposed portion of the Salish Sea¹, contrasting with wave energy conditions of the more sheltered shores of the county. Erosion is an important consideration in land and shoreline use decisions because it affects the long-term stability of the land adjacent to the shore, as well as habitat formation and maintenance. The West Whidbey shoreline is exposed to considerable fetch (the distance wind and waves can travel unimpeded before reaching the shoreline) but is protected from ocean-swell. Wind and wave conditions along the West Whidbey shoreline are influenced by exposure to the Pacific Ocean via the Strait of Juan de Fuca, and to a lesser degree the Admiralty Inlet to the south and Rosario Strait to the north. The intensity of westerly winds also results in wind-driven sediment transport and deposition, an uncommon phenomenon in the Puget Sound region. As a result of these erosional forces, the exposed high gradient, bluffs and banks of West Whidbey Island are more susceptible to coastal landslides than the East Whidbey and Camano Island shores of the county.

Reach Inventory Organization: The inventory refers to data collected from available sources and presented in countywide format in the Map Folio included as Appendix A. In this section, inventory information for each reach is presented as a ‘reach sheet’ where pertinent reach characteristics are detailed and presented with a reach map (2009 aerial photography) and shoreline oblique photos (Ecology 2006). Reach inventory and characterization information is grouped into four broad categories: 1) physical resources; 2) marine habitats and species; 3) shoreland habitats and species; and 4) shoreline use patterns. Information sources for the content included on each of the marine reach sheets are detailed on the Reach Sheet Guide, included at the start of the reach sheets for Section 5.1.4.

¹ The Salish Sea consists of the coastal waterways surrounding southern Vancouver Island and the Puget Sound; major water bodies include the Strait of Georgia, Strait of Juan de Fuca, and Puget Sound.

Table 5-1. West Whidbey (WW) Island Marine Reaches

Reach Label	Reach Description
Strait of Juan de Fuca (Section 5.1)	
Smith and Minor Islands	Smith Island and Minor Island
WW1	Deception Pass State Park (West Side), Cranberry Lake, Moran Beach and Whidbey Island Naval Air Station
WW2	Joseph Whidbey State Park, Swan Lake and South to Libbey Road
WW3	Fort Ebey State Park and Perego's Lagoon
Admiralty Inlet (Section 5.2)	
WW4	Crockett Lake, Keystone Ferry, Fort Casey State Park, and Driftwood Park
WW5	Lake Hancock (coastal lagoon)
WW6	Lagoon Point, South Whidbey State Park, Bush Point Lagoon, Mutiny Bay
WW7	Useless Bay, Deer Lagoon, Lone Lake (wetlands)
WW8	Dave Mackie Park, Maxwellton
WW9	Cultus Bay

Key alterations and impairments are summarized from existing data sources. Reach-specific restoration opportunities were identified by PSNERP Puget Sound Restoration Planning Activities, WRIA 6 Salmon Recovery Plan and during detailed assessment of existing marine shoretypes in 2005 (Coastal Geologic Services, 2005).

The reach scale assessment establishes a baseline of conditions along the West Whidbey shorelines that will be used to develop shoreline designations, and to revise policies and regulations, with the aim of achieving no net loss of shoreline functions. A summary of key opportunities and management issues for all West Whidbey reaches is included in Section 5.3.

5.1 Strait of Juan de Fuca Shorelines

The West Whidbey Strait of Juan de Fuca shorelines extend from Deception Pass at the northern tip of Whidbey along the Strait of Juan de Fuca shoreline fronting Cranberry Lake, the Whidbey Island Naval Air Station, Joseph Whidbey State Park, Swan Lake (a coastal lagoon) and around Point Partridge into the marine shoreline fronting Ebey's Landing and Fort Ebey State Park.

5.1.1 Physical Characterization

The Strait of Juan de Fuca shores of Whidbey Island are the most exposed shores of the Salish Sea and are heavily influenced by wind and wave driven processes. The shores of West Whidbey are largely encompassed within one large net shore-drift cell with northward drift. The shores of West Whidbey in general incur the most rapid erosion rates in the county and are predominantly bluff back beaches (43%) and barrier beaches (34%).

5.1.2 Biological Characterization

Coastal lagoons are mapped and inventoried along the Strait of Juan de Fuca shoreline, including Swan Lake and adjoining wetland areas (WW02) and Perego's's Lagoon (a closed barrier lagoon; WW03). Several short stream segments drain to the marine shoreline, primarily through Cranberry Lake (WW01) and Swan Lake (WW02).

The aquatic areas support red sea urchin habitat at northern end of the Strait of Juan de Fuca shoreline, and kelp is mapped intermittently along the western facing shoreline. Geoduck habitat is mapped in the tidal and subtidal area front Swan Lake.

Nearshore aquatic habitats and associated coastal lagoons provide habitat that supports a broad assemblage of fish and wildlife species including forage fish populations and habitat for anadromous salmon (designated as Critical Habitat for Chinook salmon – use by other anadromous salmon species assumed). Extensive and ongoing research on juvenile salmon outmigration and nearshore use and rearing discusses the likely extent and use patterns along Island County's shorelines, including western Whidbey Island shorelines (Luerkens, 2011; Beamer, 2007; Beamer et al, 2011, Beamer et al, 2006). In the 2006 report *Habitat and Fish Use of Pocket Estuaries in the Whidbey Basin and North Skagit County Bays, 2004 and 2005*, scientists from the Skagit River System Cooperative, the Stillaguamish Tribe, Tulalip Tribe, and other groups documented fish use, nearshore habitats, and habitat changes at a series of Island County sites.

5.1.3 Shoreline Use Patterns

State and federally owned facilities and property characterize the shoreline facing the Strait of Juan de Fuca. These uses include park areas (recreation areas and open space), reserves (Smith and Minor Islands), and military facilities (Naval Air Station Whidbey Island). Rural development (3 – 8 acre lots), as well as more dense areas of shoreline rural residential development (1/4 to 1 acre lots) also characterize the marine shoreline area; residential uses are mostly located between Point Partridge and Swan Lake (WW02).

Limited areas of modification occur, primarily in the area fronting North Moran Beach Lane. No overwater structures occur along the Strait of Juan de Fuca marine reaches, likely partially a result of the high energy environment associated with the shoreline, which makes dock design and maintenance challenging and expensive.

Existing public access is provided extensively along Whidbey Island's Strait of Juan de Fuca shoreline, through both large public park areas and at beach access points. Public access is provided to Reaches WW01 (Deception Pass State Park), WW02 (Joseph Whidbey State Park and a boat launch facility), and WW03 (Fort Ebey State Park and the adjoining Ebey's Landing National Historical Reserve). There is no public access to Smith and Minor Islands, which are designated as an Aquatic Reserve by Washington State Department of Natural Resources.

5.1.4 Reach Analysis

This section includes reach summaries (as reach information sheets) for West Whidbey Island's four Strait of Juan de Fuca marine shoreline reaches, as depicted in Figure 5-1.

Figure 5-1. West Whidbey Island marine reaches along the Strait of Juan de Fuca.



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5.2 Admiralty Inlet Shorelines

The western Whidbey Island Admiralty Inlet shorelines extend from Fort Casey and the Keystone vicinity at the north end (WW04) to Cultus Bay and the southern tip of Whidbey Island.

5.2.1 Physical Characterization

The Admiralty Inlet shorelines of Whidbey Island form a complex, crenulated shoreline with more embayments and variable fetch than along the Strait of Juan de Fuca. This has resulted in the development of eight net shore-drift cells and associated depositional landforms including barrier lagoons and estuaries, such as Bush Point and Lake Hancock (Keuler 1988). The direction of drift is influenced by the shore orientation and maximum fetch.

5.2.2 Biological Characterization

Coastal lagoons are mapped and inventoried along Whidbey Island's Admiralty Inlet shoreline, including Crockett Lake and adjoining wetland areas, Admiral's Lagoon (both within WW04), Hancock Lake (a large, intact open coastal lagoon; WW05), Bush Point Lagoon (highly modified with surrounding residential development; WW06), Deer Lagoon (partially diked adjoining Useless Bay; WW07) and as well as several other smaller features.

In reach WW08, a large wetland complex draining several mapped salmonid streams is associated with the shoreline; the marine area fronting this wetland area is a documented area of juvenile salmonid rearing within Island County. Extensive and ongoing research on juvenile salmon outmigration and nearshore use and rearing discusses the likely extent and use patterns along Island County's shorelines, including western Whidbey Island shorelines (Luerkens, 2011; Beamer, 2007; Beamer et al, 2011, Beamer et al, 2006). In the 2006 report *Habitat and Fish Use of Pocket Estuaries in the Whidbey Basin and North Skagit County Bays, 2004 and 2005*, scientists from the Skagit River System Cooperative, the Stillaguamish Tribe, Tulalip Tribe, and other groups documented fish use, nearshore habitats, and habitat changes at a series of Island County sites. In fact, marine nearshore areas are probably utilized for rearing and as migratory corridors for anadromous salmonids throughout the Admiralty Inlet shorelines. The entire nearshore extent of the Whidbey's Admiralty Inlet shorelines are designated as Critical Habitat for Chinook; the Cultus Bay shoreline is designated Critical Habitat for bull trout.

Marine aquatic areas support Dungeness crab, geoducks and hardshell clams. Eelgrass and kelp areas and areas supporting forage fish are mapped intermittently throughout the shoreline.

Crockett Lake and Deer Lagoon are designated as Important Bird Areas (IBAs) by the Audubon Society (Audubon Society, 2001). The brackish lagoons, adjacent marine beaches, associated wetlands, and surrounding riparian and upland areas provide significant habitat for numerous bird species, including high densities of autumn migrating shorebirds and raptors (following shorebirds as prey food). Winter habitat is provided for bald eagles and duck species. The Audubon Society has documented 213 bird species in the Crockett Lake area (Audubon Society, 2001).

5.2.3 Shoreline Use Patterns

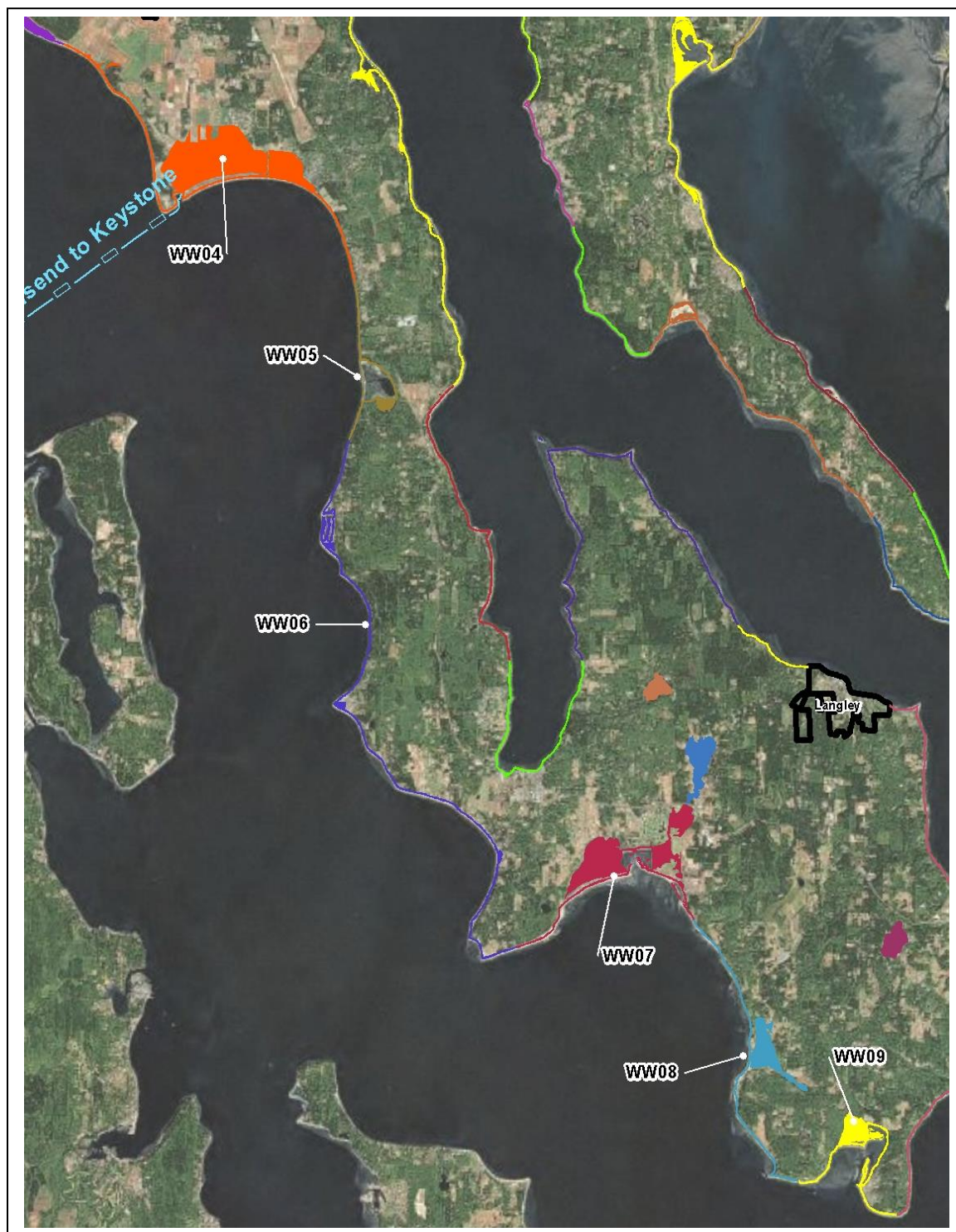
Land use throughout the Admiralty Inlet shoreline is characterized by a mix of low to moderate density residential development and public facilities, public parks and open space areas. Publicly owned and managed areas range in character from undeveloped park areas within Fort Casey State Park, Ebey's Landing and South Whidbey State Park to high intensity facilities along and adjacent to Keystone Harbor. The ferry terminal facility and a public boat launch at the southeast mouth of the harbor include overwater structures. Development within the State Park to the west of Keystone Harbor also includes camping and access facilities within the shoreline. Shoreline armoring is common through these areas. Land use is comprised of federally owned (military) open space throughout Lake Hancock lagoon area.

Rural residential development occurs behind high bluff areas at lower densities than low-bank shoreline development in other areas of the Admiralty Inlet shoreline. Where shoreline residential development occurs in front of shoreline slopes, or in lower bank areas, bulkheads and other armoring are prevalent. Several pockets of high density shoreline development occur along the shoreline, including Lagoon Point and Bush Point within Reach WW06 and Sandy Hook along the east side of Cultus Bay within Reach WW09. Numerous overwater structures providing private residential moorage are located within the Lagoon Point and Sandy Hook communities; these are the only two areas where high densities of private recreational piers are common along the entire West Whidbey Island shoreline.

5.2.4 Reach Analysis

This section includes reach summaries (as reach information sheets) for West Whidbey Island's six Admiralty Inlet marine shoreline reaches (WW04 – WW09), as depicted in Figure 5-2.

Figure 5-2. Admiralty Inlet marine reaches along the Strait of Juan de Fuca.



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5.3 Summary of Opportunity Areas and Management Issues

5.3.1 Key Opportunity Areas

Key opportunities in the West Whidbey shorelines include:

- Intact coastal feeder bluffs and beaches; and
- Several coastal lagoons that may be feasible for restoration.

5.3.2 Management Recommendations

Based upon this inventory and characterization, several preliminary management recommendations have been developed for the West Whidbey shorelines. These broad recommendations apply to future management decisions for marine shorelines of the state in the County including the development of shoreline environment designations, goals and policies, and shoreline regulations. Management recommendations for West Whidbey include:

- Marine shorelines with high-value coastal feeder bluffs, coastal lagoons, mature riparian habitat should be preserved in an unaltered condition and considered for the Natural Environment designation; preservation of these unaltered areas will preserve existing habitat functions, including habitat supporting ESA listed salmonids and state designated priority species;
- Continue to partner with the Tulalip Tribes, the Swinomish Tribe, the U.S. Navy, neighboring counties, and other stakeholders to restore coastal wetlands and estuarine habitat along the Strait of Juan de Fuca shoreline (Cranberry Lake and Swan Lake vicinities) and at Crockett Lake (lagoon), Lake Hancock (lagoon), and Useless Bay / Deer Lagoon;
- New development proposals should be required to provide an analysis of impacts to shoreline ecological functions during permit review;
- Water pollution should be prevented at its source (PSP, 2008). In areas of denser residential development and higher roadway density, consider incentives to retrofit existing stormwater management facilities to improve water quality and consider requiring low impact development strategies or higher levels of water quality improvement for new development;
- In order to avoid further degradation of natural erosion and accretion, limit new shoreline stabilization and require soft-shore armoring techniques where new armoring or retrofits cannot be avoided;
- Consider development standards to protect forage fish spawning areas and eelgrass beds within the marine nearshore;

- Consider standards to prevent the introduction of non-native invasive species and facilitate their rapid eradication; and
- Build an implementation, monitoring and adaptive management plan at the County level in order to track changes in the shoreline jurisdiction and determine successes, failures and corrective actions (PSP, 2008).

Additional recommendations may be developed for later drafts of this document.